Periodic Table

* Organized by **increasing atomic number**
* Two main groups: **Metals and Nonmetals**
* **Left side:** greatest metallic properties (copper: shiny, siver: shiny)
* **Right side:** elements become less metallic
* **Middle:** transition elements
* **Elements that touch zigzag:** metalloids (have both metallic & nonmetallic properties)
* **Groups/Families:** vertical columns

|  |  |
| --- | --- |
| **Properties** | |
| Metals | Nonmetals |
| Good electrical and heat conductors | Poor conductors of heat and electricity |
| Malleable – can be beaten into thin sheets | Brittle – if in a solid form |
| Ductile – can be stretched into wire | Nonductile |
| Possess metallic luster | Do not possess metallic luster |
| Opaque as thin sheet (can’t see through) | Transparent as a thin sheet (can see through) |
| Solid at room temperature (except Hg) | Solids, liquid or gases at room temperature |
| Lose their valence electrons easily | Gain or share valence electrons easily |

* Further to the left more reactive metals
* Further to the right (except last column) more reactive non-metals
* Last column on right (Noble Gases) Happy Campers because they have 8 electrons
* Circle Francium (Fr) most reactive metal
* Circle Flouirine (F) most reactive non-metal
* NaCl: Where is Na? Where is Cl?   
   - Things on the left react with things on the right  
   -Non-metals react with each other  
   -Metals don’t react with other metals
* HCl: Where is H? Where is Cl?

-Things on the left react with things on the right (party)

-HCl is hydrochloric acid: the liquid I used in Hydrogen Bubbles Demo

-HCl (non-metal) reacted with the Zinc (metal) HCl + Zn 🡪 Reaction

* **Elements have only one capital letter (H)**
* **Compounds have at least 2 capital letters (H2O)**

|  |
| --- |
| **Common Chemical Formulas** |
| NaCl (table salt) |
| H20 (water) |
| C6H12O6 (sugar) |
| O2 (oxygen gas) |
| CO2 (carbon dioxide) |
| N2 (nitrogen gas) |

**Acids and Bases**

* Acids and Bases together in equal quantities Neutral solution
* Base OH as last 2 elements of the compound
* Acid H as first element in compound
* \*\*Acids taste sour  
  \*\*Acids react strongly with metals (Zn + HCl)  
  \*\*Strong Acids are dangerous and can burn your skin
* \*\*Bases taste bitter  
  \*\*Bases feel slippery  
  \*\*Strong bases are very dangerous and can burn your skin

**Oxidization:** *Adding Oxygen* 🡪 Something + oxygen is how you know it’s combustion

* **Rusting** (slow oxidation): Iron + Oxygen FeO2
* **Combustion** (fast oxidation): C6H12O6 + 6O2 6CO2 + 6H2O

(sugar + oxygen carbon dioxide + water)   
 **respiration equation**: what’s happening in your body

* **Oxidation** produces heat
* **Food Spoilage** (oxidation): Apple turning brown is the result of the apple reacting with the oxygen in the air.

**Reactant + Reactant** **Product**

NaOH + HCL NaCL + H20

Sugar + Water Sugar Water

**Reactant:** Things that are reacting together

**Product:** The end result

**Law of Conservation of Mass**

* The mass of the reactants must equal the mass of the product

**Balancing Chemical Equations:**

* Matter is not created or destroyed matter can be named something new

**Example 1**  
Unbalanced Equation:- C3H8 + O2 ---> H2O + CO2

There are three carbons on the left, but only one on the right.  
There are eight hydrogens on the left but only two on the right.  
There are two oxygens on the left but three on the right.

Balanced Equation:- C3H8 + 5O2 ---> 4H2O + 3CO2

**Signs of Chemical Reaction:**

* Smoke
* Temperature change
* Bubbles/fizzing
* Gas production
* Energy released
* Change in color (not always)
* New substance created